U.S. House of Representatives Committee on Transportation and Infrastructure

Subcommittee on Highways and Transit

Hearing Title:
"Pricing and Technology Strategies to Address Congestion on and Financing of America's Roads"

Testimony of

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Chair Norton, Ranking Member Davis, Chairman DeFazio, Ranking Member Graves, and Members of the Subcommittee, thank you for inviting me to testify before the Subcommittee regarding the impact of congestion and possible solutions to address it. My name is Tim Lomax and I am a Regents Fellow at the Texas A&M Transportation Institute (TTI). Established in 1950 and part of the Texas A&M University System, TTI is a state agency and the largest and most comprehensive higher education-affiliated transportation research center in the United States. TTI has conducted work in all 50 states and in 51 countries.

The Texas A&M University System is one of the largest systems of higher education in the nation, with a budget of $4.7 billion. Through a statewide network of 11 universities and eight state agencies, the Texas A&M System educates more than 153,000 students and makes more than 22 million educational contacts through service and outreach programs each year. System-wide, research and development expenditures exceeded $996 million in FY 2017.

Last month, TTI released its *2019 Urban Mobility Report*. Funded by the Texas Department of Transportation and completed in cooperation with INRIX, the Urban Mobility Report examines traffic conditions in 494 urban areas across all states and Puerto Rico. While the Urban Mobility Report has been a showcase product of TTI for over two decades, the depth, breadth and comprehensiveness of the report was transformed with funding from TTI-led USDOT University Transportation Centers. These UTC-sponsored improvements included the use of real-time travel speed data through a partnership with a private vendor (data provided at no cost to TTI) – a first-of-its-kind use that preceded a similar effort by the Federal Highway Administration by several years. TTI was also able to increase the number of urban areas analyzed, improve our estimates of the economic impact of congestion, freight movement effects, and the effect of transit on congestion levels.

The *2019 Urban Mobility Report* found that congestion is back to its growth pattern after the economic recession. The 8- to 10-year growing economy has brought traffic congestion to the highest measured levels in most U.S. cities. The myriad possible solutions –more highways, streets and public transportation; better traffic operations; more travel options; new land development styles; and advanced technology – have not been deployed in sufficient numbers to restrain the mobility degradation.

For more information and congestion data on the individual cities, visit: http://mobility.tamu.edu/umr.

The trends from 1982 to 2017 (see Exhibit 1) show that congestion is a persistently growing problem.

- The problem is larger than ever. In 2017, congestion caused urban Americans to travel an extra 8.8 billion hours and purchase an extra 3.3 billion gallons of fuel for a congestion cost of $166 billion.
- Trucks account for $21 billion of the cost, a much bigger share of the cost than their 7 percent of traffic.
- The average auto commuter spends 54 hours in congestion and wastes 21 gallons of fuel due to congestion at a cost of $1,010 in wasted time and fuel.
- The variation in congestion is often more difficult for commuters and freight shippers to accommodate than the regular, predictable back-ups. To reliably arrive on time for important freeway trips, travelers had to allow 34 minutes to make a trip that takes 20 minutes in light traffic.
- Employment was up by 1.9 million jobs from 2016 to 2017, slower growth than the 2.3+ million job growth in 4 of the previous 5 years, but substantial enough to cause congestion growth (*1*). Exhibit 2 shows the historical national congestion trend.

- More detailed speed data on more roads and more hours of the day from INRIX (*2*), a leading private sector provider of travel time information for travelers and shippers, were combined with travel volume estimates developed from the Federal Highway Administration's Highway Performance Monitoring System (*3*).

Each region should use the **combination of strategies that match its goals and vision**. There is no panacea. And the decade-long recovery from economic recession has proven that the problem will not solve itself.

Exhibit 1. Major Findings of the *2019 Urban Mobility Report* (494 U.S. Urban Areas)

(Note: See page 3 for description of changes since the 2015 report)

Measures of…	1982	2000	2012	2017	5-Yr Change
… Individual Congestion					
Yearly delay per auto commuter (hours)	20	38	47	54	15%
Travel Time Index	1.10	1.19	1.22	1.23	1 Point
Planning Time Index (Freeway only)	--	--	--	1.67	--
"Wasted" fuel per auto commuter (gallons)	5	16	20	21	5%
Congestion cost per auto commuter (2017 $)	$550	$860	$910	$1,010	11%
… The Nation's Congestion Problem					
Travel delay (billion hours)	1.8	5.3	7.7	8.8	14%
"Wasted" fuel (billion gallons)	0.8	2.5	3.2	3.3	3%
Truck congestion cost (billions of 2017 dollars)	$1.9	$7.1	$14.6	$20.5	40%
Congestion cost (billions of 2017 dollars)	$14	$71	$142	$166	17%

Yearly delay per auto commuter – The extra time spent during the year traveling at congested speeds rather than free-flow speeds by private vehicle drivers and passengers who typically travel in the peak periods.

Travel Time Index (TTI) – The ratio of travel time in the peak period to travel time at free-flow conditions. A Travel Time Index of 1.30 indicates a 20-minute free-flow trip takes 26 minutes in the peak period.

Planning Time Index (PTI) – The ratio of travel time on the worst day of the month to travel time in free-flow conditions.

Wasted fuel – Extra fuel consumed during congested travel.

Congestion cost – The yearly value of delay time and wasted fuel by all vehicles.

Truck congestion cost - The yearly value of extra operating time and wasted fuel for commercial trucks.

Exhibit 2. National Congestion Measures, 1982 to 2017

Year	U.S. Jobs (Millions)	Delay Per Commuter (Hours)	Total Delay (Billion Hours)	Fuel Wasted (Billion Gallons)	Total Cost (Billions of 2017 Dollars)
5-Year Change	8%	15%	14%	3%	17%
2017	153.3	54	8.8	3.3	$166
2016	151.4	53	8.6	3.3	$157
2015	148.8	51	8.4	3.3	$153
2014	146.3	50	8.2	3.2	$152
2013	143.9	48	8.0	3.2	$148
2012	142.5	47	7.7	3.2	$142
2011	139.9	45	7.5	3.2	$133
2010	139.1	44	7.2	3.1	$124
2009	139.9	43	6.9	3.1	$116
2008	145.4	42	6.8	3.2	$119
2007	146.1	43	6.8	3.2	$113
2006	144.4	42	6.7	3.1	$108
2005	141.7	42	6.6	3.0	$101
2004	139.2	41	6.3	2.9	$94
2003	137.7	41	6.1	2.8	$86
2002	136.5	40	5.9	2.7	$81
2001	136.9	39	5.6	2.6	$77
2000	136.9	38	5.3	2.5	$71
1999	133.5	37	5.1	2.3	$65
1998	131.5	36	4.8	2.2	$60
1997	129.6	36	4.6	2.1	$56
1996	126.7	34	4.3	2.0	$52
1995	124.9	33	4.1	1.9	$48
1994	123.1	32	3.8	1.8	$44
1993	120.3	31	3.6	1.7	$40
1992	118.5	30	3.4	1.6	$37
1991	117.7	29	3.2	1.5	$34
1990	118.8	28	3.0	1.4	$30
1989	117.3	27	2.9	1.3	$27
1988	115.0	26	2.7	1.2	$25
1987	112.4	25	2.5	1.1	$22
1986	109.6	24	2.4	1.1	$20
1985	107.2	23	2.2	1.0	$19
1984	105.0	22	2.1	0.9	$17
1983	100.8	21	1.9	0.9	$15
1982	99.5	20	1.8	0.8	$14

Note: See Exhibit 1 for explanation of measures. For more congestion information see Tables 1 to 4 in the report. For congestion information on individual cities, visit http://mobility.tamu.edu/umr.

Congestion Problems and Trends

Rush-hour traffic jams are expected in big cities. When a large percentage of workers are on an 8 a.m. to 5 p.m. or 9 a.m. to 5 p.m. schedule, there will be travel delays on freeways, streets, and even public transportation. This results in a "rush hour" in the morning and afternoon. The problem obviously affects commuters, but it also affects many other trip types: manufacturers that rely on a reliable transportation system and companies who have delivery schedules and service calls. Some key measures are listed below. See data for your city at http://mobility.tamu.edu/umr/congestion_data.

Congestion costs are increasing. The "invoice" for only two of the congestion effects – the cost of extra time and fuel – in the 494 U.S. urban areas was (all values in constant 2017 dollars):

- In 2017 – $166 billion
- In 2016 – $157 billion
- In 2000 – $71 billion
- In 1982 – $14 billion

Congestion wastes a massive amount of time and fuel and creates more uncertainty for travelers and freight. In 2017:

- 8.8 billion hours of extra travel time (in that time, 124 million couples could binge-watch all eight seasons of Game of Thrones).
- 3.3 billion gallons of wasted fuel (equal to a line of 18-wheeler fuel trucks from Los Angeles to Boston).
- And if all that isn't bad enough, travelers and freight shippers making important trips had to add nearly 70 percent more travel time compared with light traffic conditions to account for the effects of unexpected crashes, bad weather, special events and other irregular congestion causes.

Congestion is also a type of tax

- $166 billion of delay and fuel cost (equal to the cost of about 163 million summer vacations)
- The negative effect of uncertain or longer delivery times, missed meetings, business relocations and other congestion-related effects are not included.
- 12 percent ($21 billion) of the delay cost was the effect of congestion on truck operations (equivalent to the average grocery bills of 2.7 million families); this does not include any value for the goods being transported in the trucks.
- The cost to the average auto commuter was $1,010; it was an inflation-adjusted $550 in 1982.

Congestion affects people who travel during the peak period. The average auto commuter:

- Spent an extra 54 hours traveling – more than a week of vacation – up from 20 hours in 1982.
- Wasted 21 gallons of fuel in 2017 – a week's worth of fuel for the average U.S. driver – up from 5 gallons in 1982.
- In areas with over 1 million persons, 2017 auto commuters experienced:
  - an average of 71 hours of extra travel time;
  - a road network that was congested for about 6 hours of the average weekday;
  - had a congestion tax of $1,330.

Congestion is also a problem at other hours.

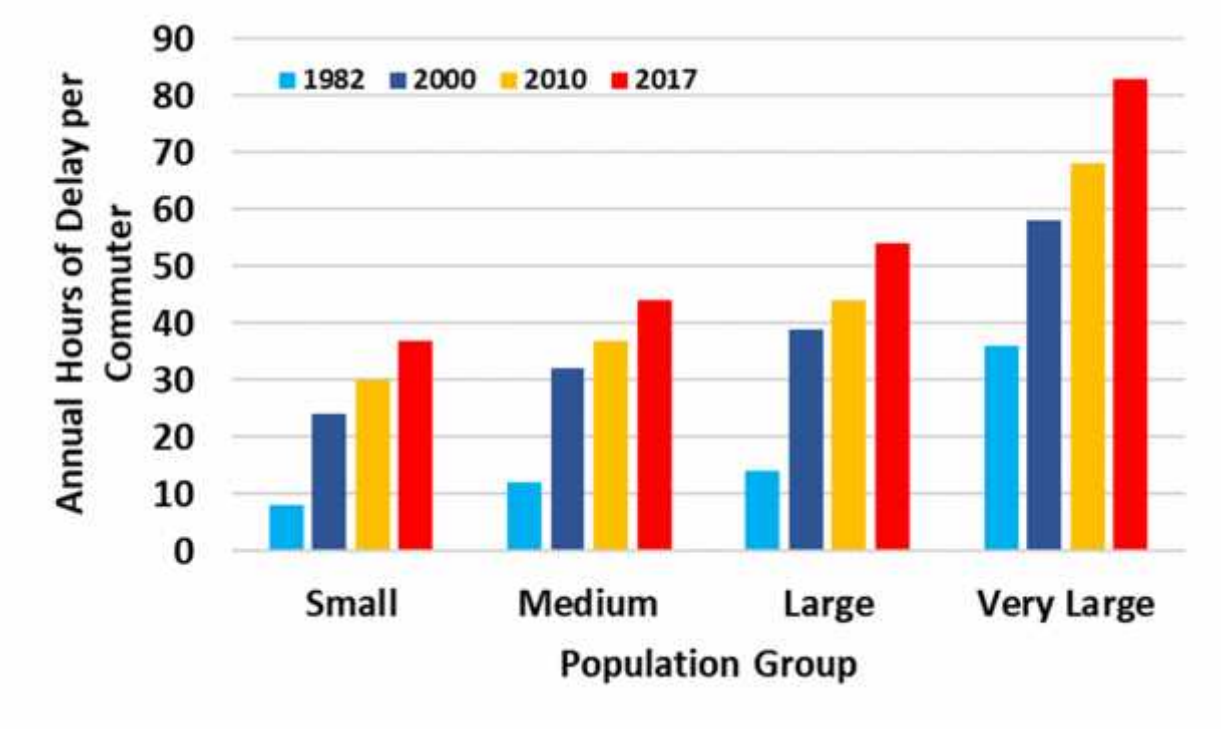
- Approximately 33 percent of total delay occurs in the midday and overnight (outside of the peak hours) times of day when travelers and shippers expect free-flow travel.

Congestion, by every measure, has increased substantially over the 36 years covered in this report. Almost all regions have worse congestion than before the 2008 economic recession which caused a decrease in traffic problems. Traffic problems as measured by per-commuter measures are worse than a decade ago. Since there are so many more commuters, as well as more congestion during off-peak hours, total delay has increased by two billion hours. The total congestion cost has also risen with more wasted hours, greater fuel consumption and more trucks stuck in stop-and-go traffic.

Congestion is worse in areas of every size – it is not just a big city problem. The growing delays also hit residents of smaller cities (Exhibit 3). The growth trend looks similar for 2000, 2010 and 2017, but that final period is only 7 years long, suggesting that if the economy does not enter another recession, congestion will be a much larger problem in 2020.

Both big towns and small cities have congestion problems. Every economy is different and smaller regions often count on good mobility as a quality-of-life aspect that allows them to compete with larger, more economically diverse regions. As the national economy improves, it is important to develop the consensus on action steps, as major projects, programs and funding efforts take 10 to 15 years to develop.

Exhibit 3. Congestion Growth Trend – Hours of Delay per Auto Commuter



Small = less than 500,000
Medium = 500,000 to 1 million
Large = 1 million to 3 million
Very Large = more than 3 million

The Trouble With Planning Your Trip

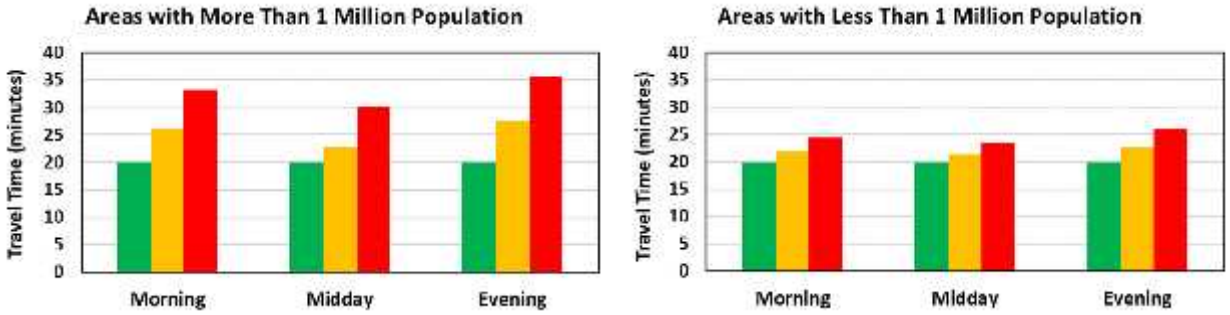
Many urban residents, travelers and freight movers have given up on having congestion-free trips in rush hours; they would just like some dependability in their travel times. The variation in travel time from day-to-day is often more frustrating than expected congestion. We know that for those urgent trips—catching an airplane, getting to a medical appointment or picking up a child at daycare on time – we need to leave a little earlier to make sure we are not late. And this need to add extra time is not just a "rush hour" consideration.

Exhibit 4 illustrates this problem. Say your typical trip takes 20 minutes when there are few other cars on the road. That is represented by the green bars. Your trip usually takes longer, on average, whether that trip is in the morning, midday or evening. This "average trip time" is shown in the yellow bars in Exhibit 10. In 2017, the average big city auto commute was 26 minutes in the morning and 28 minutes in the evening peak hours.

Now, if you must make a very important trip during any of these time periods there is additional "planning time" you must allow to reliably arrive on-time. As shown in the red bars in Exhibit 10, your 20-minute trip means you should plan for around 33 minutes in the morning, 36 minutes in the evening and 30 minutes during the midday when congestion is not usually a concern.

This is not just a "big city rush hour" problem; the planning time averages 24 minutes in the morning and 26 minutes in the evening for the smaller regions.

Exhibit 4. How Much Time Must You Allow to Be 'On-Time' for a 20-Minute Trip?



Green Bar – No congestion
Yellow Bar – Average congestion
Red Bar – Plan around this congestion if you're making an important trip

Delivering the Goods: And Your Role in the Congestion Impacts on Trucking

What causes all the trucks on the road anyway?

Do you eat anything or buy anything? Of course you do. We all do. And getting all that stuff to you requires trucks.

The consumer expectation to "get it now" has resulted in a boom in e-commerce. This e-commerce growth will continue. Booming economies and growing areas require goods and services, and the trucks to provide them.

What are the impacts of congestion on trucking and trucking on congestion?

The price tag for truck congestion cost is over $20 billion in wasted time and fuel. Truck congestion is 12 percent of the total congestion cost, but trucks are only 7 percent of the traffic. Only half of the $20 billion truck congestion cost is in the largest 15 urban areas, illustrating that truck congestion is a problem spread throughout all urban areas. Furthermore, the share of truck cost to the total congestion cost has gone up from 10 percent in 2012 to 12 percent in 2017.

Being on-time is particularly important for truck deliveries. Just-in-time manufacturing and on-time parcel deliveries make travel time predictability a critical need. On average in the 101 most congested urban areas, we find that to ensure an on-time delivery for the most important trips, truckers need to add 15 minutes to a trip that typically takes 20 minutes in light traffic (see Table 3). In Los Angeles, nearly 40 additional minutes are needed for urgent trips. This unreliability in the transportation system is especially detrimental for the trucking community and service companies.

There are many other costs incurred by shippers and carriers due to a congested and unreliable transportation system, which are not captured in our congestion costs. Companies need more trucks to make deliveries and service calls, they invest more time and technology to "beat the traffic" and more distribution centers are needed to fulfill demand.

What can be done?

In many dense urban areas, there is daily competition where the battle trenches are the curb space along our urban streets. It is here that freight delivery vehicles jockey with cars, buses, on-demand transportation services and other activities. The congestion, and the battle at the curb, puts a tremendous strain on shippers and carriers looking to gain any competitive edge, as well as motorists, cyclists and other users.

Managing the time spent in loading zones can help mitigate the problem; common delivery areas such as locked spaces where deliveries and pick-ups can be done at different times provide one possible solution in urban areas. Transportation providers are also testing technologies such as automated vehicles, delivery robots or drones for deliveries, as well as cargo cycles and other transport methods.

Congestion Relief – An Overview of the Strategies

We recommend a ***balanced and diversified approach*** to reduce congestion – one that focuses on more of everything; more policies, programs, projects, flexibility, options and understanding. It is clear that the solution investments have not kept pace with the problems. Most urban regions have big problems now – more congestion, poorer pavement and bridge conditions and less public transportation service than they would like.

What is the right solution to a specific congestion problem? The answer is usually found in one word:

Context.

Almost every solution strategy works somewhere in some situation. And almost every strategy is the wrong treatment in some places and times. ***Anyone who tells you there is a single solution that can solve congestion, be supported and implemented everywhere (or even in most locations) is exaggerating the effect of their idea.***

Some solutions need more congestion before they are fully effective, and some can be very useful before congestion is a big problem. There is almost always a role for providing more travel options and operating the system more efficiently. Their effects are important but, especially in growing regions, they will not be enough to meet community mobility goals. The private sector, the market and government regulations all play a role. Some cities see growth near downtowns that provide good home and work options, but rarely dominate the regional growth trends. Governments have been streamlining regulations to make near-town developing as easy as suburban developments.

More information on the possible solutions, places they have been implemented and their effects can be found on the website: https://policy.tti.tamu.edu/congestion/how-to-fix-congestion/

None of these ideas are the whole mobility solution, but they can all play a role.

- **Get as much as possible from what we have** – "Get the best bang for the buck" is the theme here. Many low-cost improvements have broad public support and can be rapidly deployed. These operations programs require innovation, new monitoring technologies and staffing plans, constant attention and adjustment, but they pay dividends in faster, safer and more reliable travel. Rapidly removing crashed vehicles, timing traffic signals so that more vehicles see green lights, and improving road and intersection designs are relatively simple actions. More complex changes, such as traffic signals that rapidly adapt to different traffic patterns, systems that smooth traffic flow and reduce traffic collisions, and communication technologies that assist travelers (in all modes) and the transportation network also play a role.
- **Provide choices** – "Customize your trip" might involve different travel routes, departure times, travel modes or lanes that involve a toll for high-speed and reliable service. These options allow travelers and shippers to make trips when, where and in a form that best suits their needs and wants. There are many sources of travel information involving displays of existing travel times,

locations of roadwork or crashes, transit ridership and arrival information, and a variety of trip planner resources. The solutions also involve changes in the way employers and travelers conduct business to avoid traveling in the traditional "rush hours." Flexible work hours, internet connections or phones allow employees to choose work schedules that meet family needs *and* the needs of their jobs. Companies have seen productivity increase when workers are able to adjust their hours and commute trips to meet family or other obligations.

- **Add capacity in critical corridors** – "We just need more" in some places. Increases in freight and person movement often require new or expanded facilities. Important corridors or growing regions can benefit from more street and highway lanes, new or expanded public transportation facilities, and larger bus and rail fleets. Some of "more" will be better paths and routes for bicyclists and pedestrians. Some of the "more" will also be in the form of advancements in connected and autonomous vehicles – cars, trucks, buses and trains that communicate with each other and with the transportation network resulting in reduced crashes and congestion.
- **Diversify the development patterns** – "Everyone doesn't want to live in <fill in the blank>" is a discussion in most urban regions. It is always true – because there is no one-size-fits-all home type. The market is diverse for the same reasons as the U.S. culture, economy and society is varied. The "real market" includes denser developments with a mix of jobs, shops and homes (so that more people can walk, bike or take transit to more and closer destinations). Also, urban residential patterns of moderate density single-family and multi-family buildings, and suburban residential and commercial developments are popular today. Sustaining quality-of-life and gaining economic development without the typical increment of congestion in each of these sub-regions appears to be part, but not all, of the mobility solution. Recognizing that many home and job location choices are the result of choices about family, elementary and secondary education preferences, and entertainment and cultural sites allows planners to adjust projects and policies to meet these varied markets.
- **Technology advancements** also hold promise as solutions. While we are not yet at the "Meet George Jetson" level of technology, the technology disruptors coming to market every week will alter the urban mobility landscape. Crowdsourced data from INRIX has improved the report, and an increasingly connected world will offer more opportunities to understand and improve the movement of people, goods and the data itself. Connected vehicles "talking" to each other, such as traffic signals and other systems – and providing this information to decision-makers – will provide unprecedented data and insights to identify and fix mobility problems. Newer model vehicles sense and adjust to their surroundings, increasing safety and efficient movement of goods and people. Other technologies, such as The Internet of Things (IoT) ("connected things"), 3D printers, Blockchain, and Artificial Intelligence (AI) will impact transportation systems of the future. Will the mobility improvements of these technologies offset induced trips or other unforeseen mobility consequences? In many cases, it will. Again, *context* is the key, and the jury is still out on the evolving impacts.
- **Realistic expectations** are also part of the solution. Large urban areas will be congested. Some locations near key activity centers in smaller urban areas will also be congested. Identifying solutions and funding sources that meet a variety of community goals is challenging enough without attempting to eliminate congestion in all locations at all times. Congestion does not have to be an all-day event, and in many cases, improving travel time awareness and predictability can be a positive first step toward improving urban mobility.

Case studies, analytical methods and data are available to support development of these strategies and monitor the effectiveness of deployments. There are also many good state and regional mobility reports that provide ideas for communicating the findings of the data analysis.

Where Should the Congestion Solutions Be Implemented?

There will be a different mix of solutions in metro regions, cities, neighborhoods, job centers and shopping areas. Some areas might be more amenable to construction solutions, while other areas might use more technology to promote and facilitate travel options, operational improvements, or land use redevelopment. In all cases, the solutions need to work together to provide an interconnected network of smart transportation services as well as improve the quality-of-life.

There will also be a range of congestion targets. Many large urban areas, for example, use a target speed of 35 mph or 45 mph for their freeways; if speeds are above that level, there is not a "congestion problem." Smaller metro areas, however, typically decide that good mobility is one aspect of their quality-of-life goals and have higher speed expectations. Even within a metro region, the congestion target will typically be different between downtown and the remote suburbs, different for freeways and streets, and different for rush hours than midday travel.

Just like the specific set of strategies used to improve mobility is the result of a public engagement and technical design process, the level of congestion deemed unacceptable is a local decision. The 2019 Urban Mobility Report uses one consistent, easily understood comparison level. But that level is not "the goal," it is only an expression of the problem. The report is only one of many pieces of information that should be considered when determining how much of the problem to solve.

Better data can play a valuable role in all of the analyses. Advancements in volume collection, travel speed data and origin to destination travel paths for people and freight allow transportation agencies at all government levels and the private sector to better identify existing chokepoints, possible alternatives and growth patterns. The solution begins with better understanding of the challenges, problems, possibilities and opportunities – where, when, how and how often mobility problems occur. This evolves into similar questions about solutions – where, when, and how can mobility be improved. These data will allow travelers to capitalize on new transportation services, identify novel programs, have better travel time reliability and improve their access to information.

The High Cost of Doing Nothing

Transportation solutions should involve a dialogue about five significant questions.

1. What should we do?
2. How much will it cost?
3. How should we pay for it?
4. What is the benefit of doing something?
5. What is the cost of doing nothing?

If you examine the public discussion about regional or national-level solutions, however, far too often the process stops after we agree that everything should be done and that it will cost a lot. Less often there are conversations about how we could pay for solutions, the benefits of doing something and the high cost of doing nothing.

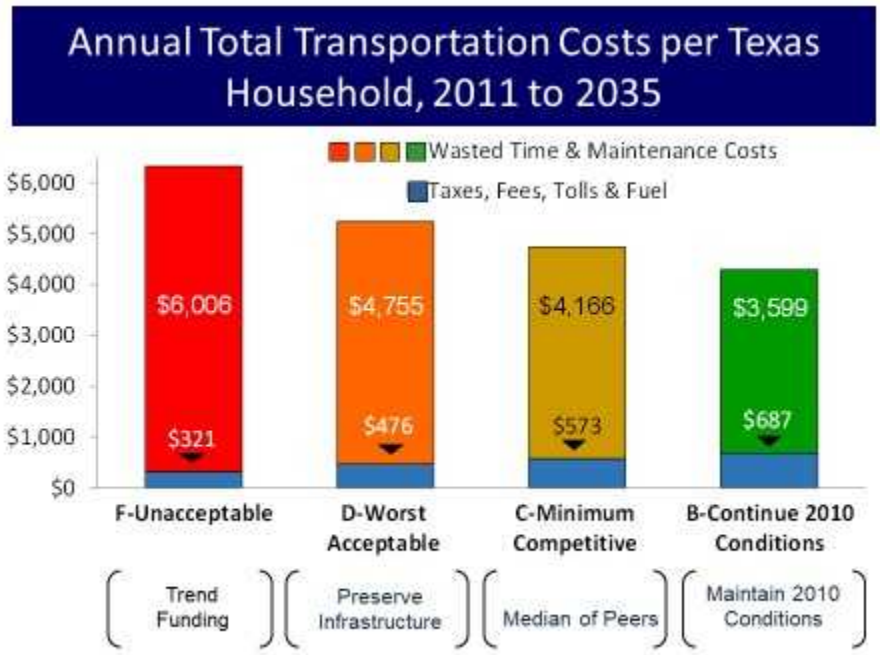
Several analyses of Texas' transportation future conducted over the past two decades have consistently pointed to the need for additional funding to address the growth challenges. The *Texas 2030 Committee*, a blue-ribbon style committee of civic and business leaders, worked from 2008 to 2011 with researchers from TTI, the Center for Transportation Research at the University of Texas, and the University of Texas at San Antonio to examine future needs in urban mobility, rural connectivity, and bridge and pavement quality (*4*). The conclusion was that Texans would pay more in transportation costs over the next 25 years – either by suffering the consequences of doing nothing to address the transportation challenges, resulting in stop-and-go traffic, lost family and work time, and economic loss, or by paying additional taxes, fees, and licenses to reduce the scale of these types of problems.

The data developed by the *Texas 2030 Committee* (Exhibit 5) clearly shows that living with the problem is more detrimental and more costly than tackling the problem with a variety of methods. The projected trend in population and job growth, as well as the expected funding levels and the resulting projects, policies and programs would see an average of $320 in transportation fees paid by the average household over the period from 2011 to 2035, while the value of extra travel time, wasted fuel, and vehicle maintenance would be about $6,000 per year. As more funds are invested in solving the problem, the lower the total costs – declining from $6,300 to $4,300 if 2010 conditions were maintained.

Five significant funding increases have been approved by the Texas Legislature and/or voters since this dialogue began 15 years ago. While congestion has increased since 2010, the conversation is about how much congestion to address and what types of solutions will be used. There is general agreement that the problem exists and must be addressed.

With Texas projected to add 1 million people every 3 years, the total cost to sustain 2010 conditions was estimated to be $273 million in 2010 dollars, while the economic impact of doing nothing other than the planned spending and policy program was $989 million. Doing nothing is not free.

Exhibit 5. Average Yearly Total Transportation Cost per Texas Household – 2011 to 2035



Source: Reference 4

Concluding Thoughts

The national economy has improved since the *2015 Urban Mobility Report*, but unfortunately congestion has gotten worse. This has been the case in the past – the economy-congestion linkage is as dependable as gravity. Some analysts had touted the decline in driving per capita and dip in congestion levels that accompanied the 2008/2009 recession as a sign that traffic congestion would, in essence, fix itself. That has not happened.

The other seemingly dependable trend – not enough of any solution being deployed – also appears to be holding in most growing regions. That is really the lesson from this series of reports. The **mix of solutions** that are used is relatively less important than the **number of solutions** being implemented. All of the potential congestion-reducing strategies should be considered, and there is a role and location for most of the strategies.

- Getting more productivity out of the existing road and public transportation systems is vital to reducing congestion and improving travel time reliability.
- Businesses and employees can use a variety of strategies to modify their work schedules, freight delivery procedures, travel times and travel modes to avoid the peak periods, use less vehicle travel and increase the amount of electronic "travel."
- In growth corridors, there also may be a role for additional road and public transportation capacity to move people and freight more rapidly and reliably.
- Some areas are seeing renewed interest in higher density living in neighborhoods with a mix of residential, office, shopping and other developments. These places can promote shorter trips that are more amenable to walking, cycling or public transportation modes.

The *2019 Urban Mobility Report* points to national measures of the congestion problem for the 494 urban areas in 2017:

- $166 billion of wasted time and fuel,
- Including $21 billion of extra truck operating time and fuel,
- An extra 8.8 billion hours of travel, and
- 3.3 billion gallons of fuel consumed

The average urban commuter in 2017:

- Spent an extra 54 hours of travel time on roads than if the travel was done in low-volume conditions, and
- Used 21 extra gallons of fuel,
- Which amounted to an average value of $1,010 per commuter.

States and cities have been addressing the congestion problems they face with a variety of strategies and more detailed data analysis. Some of the solution lies in using the smart data systems and range of technologies, projects and programs to achieve results and communicate the effects to assure the public that their project dollars are being spent wisely. And a component of the solution lies in identifying mobility level targets and implementing a range of solutions to achieve them in service to broader quality of life and economic productivity goals.

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